WE CLAIM:

1. A light detection device, comprising:

a light source configured to produce light of a first wavelength;

a wavelength converter configured to receive the light of the first wavelength and to convert that light into light of a second wavelength, where the second wavelength is different than the first wavelength;

a system for directing the light of the second wavelength to an examination area; and

a detector configured to receive luminescence light from a sample positioned in the examination area.

2. The device of claim 1, where the light source is a pulsed laser.

3. The device of claim 2, where the pulsed laser is triggered by the detector.

4. The device of claim 2, where the device is configured to discard data corresponding to a first set of laser pulses.

5. The device of claim 1 further comprising a reference beam monitor.

6. The device of claim 2, where the light source is a YAG laser.

7. The device of claim 1, where the wavelength converter includes an optical parametric oscillator.

8. The device of claim 1, where the wavelength converter converts the light of the first wavelength into the light of the second wavelength and light of a third wavelength.

9. The device of claim 8, where the energy associated with a photon of the light of the first wavelength substantially equals the sum of the energies associated with a photon of light of the second wavelength and a photon of light of the third wavelength.

10. The device of claim 8, where the system for directing the light of the second wavelength substantially discards the light of the third wavelength.

11. The device of claim 10, where the light of the third wavelength is discarded by blocking it with a suitable spectral filter.

12. The device of claim 10, where the light of the third wavelength is discarded by directing it away from the examination area.

13. The device of claim 1 further comprising a wavelength selector configured to adjust the wavelength converter to select the second wavelength.

14. The device of claim 13, where the wavelength selector operates by changing the relative angle between the light of the first wavelength and a portion of the wavelength converter.

15. The device of claim 14, where the wavelength selector automatically changes the relative angle between the light of the first wavelength and a portion of the wavelength converter.

16. The device of claim 14, where the wavelength selector changes the relative angle between the light of the first wavelength and a portion of the wavelength converter in a continuous fashion.

17. The device of claim 1, where the system for directing light includes a beamsplitter.

18. The device of claim 1, where the system for directing light includes:

an optical pattern generator configured to convert the light of the second wavelength into light having a preselected intensity pattern, and

an optical relay structure configured to project the light having the preselected pattern onto the examination area, where the projected pattern substantially conforms to the arrangement of sample sites in at least a portion of a sample holder positioned in the examination area.

19. The device of claim 18, where the sample holder is a microplate, and where the sample sites are some or all of the wells in the microplate.

20. The device of claim 1 or 18, where the light of the second wavelength follows a first path from the wavelength converter to the examination site, and the luminescence light follows a second path from the examination site to the detector, where the first and second paths are at least substantially parallel or at least substantially anti-parallel at the examination site.

21. The device of claim 1 or 18, where the light of the second wavelength follows a first path from the wavelength converter to the examination site, and the luminescence light follows a second path from the examination site to the detector, where the first and second paths are neither at least substantially parallel or at least substantially anti-parallel at the examination site.

22. The device of claim 18, where substantially all of the light in the projected pattern is incident on the sample sites.

23. The device of claim 1, where the detector is an imaging detector.

24. The device of claim 23, where the imaging detector is selected from the group consisting of charge-coupled devices (CCDs), intensified charge-coupled devices (ICCDs), and charge injection device arrays (CIDs).

25. The device of claim 1 further comprising an excitation spectral filter configured preferentially to block light of the first wavelength and substantially to transmit light of the second wavelength.

26. The device of claim 1 further comprising a fluid delivery system that includes a dispensing device configured to deliver a fluid material to the sample.

27. The device of claim 26, where the detector is configured to coordinate the reception of luminescence light from the sample with the delivery of the fluid material to the sample.

28. A light detection device, comprising:

means for producing light of a first wavelength;

means for receiving the light of the first wavelength and converting that light into light of a second wavelength, where the second wavelength is different than the first wavelength;

means for supporting a sample that is positioned in an examination area;

means for directing the light of the second wavelength to the examination area; and

means for detecting light transmitted from the sample.

29. A method of detecting light transmitted from a sample, comprising:

outputting light from a light source, the light having a first wavelength;

selectively converting the light having the first wavelength to light having a second wavelength, where the second wavelength is different than the first wavelength;

directing the light having the second wavelength onto the sample; and

measuring light transmitted from the sample induced by the light having the second wavelength.

30. The method of claim 29, where the step of selectively converting includes the step of converting the light having the first wavelength to light having the second wavelength and light having a third wavelength.

31. The method of claim 29 further comprising the step of discarding the light of the third wavelength.

32. The method of claim 29 further comprising the step of correlating the measured light with a cellular property.

33. The method of claim 29, where the light is used to determine a time-dependent property of the sample.

34. The method of claim 29, where directing the light having the second wavelength onto the sample comprises converting the light into light having a preselected intensity pattern and projecting the light having the preselected pattern onto a sample holder position in an examination area.

35. The method of claim 34, where the projected pattern substantially conforms to the arrangement of sample sites in at least a portion of the sample holder.

36. The method of claim 35 further comprising the steps of:

adding one or more reagents to a plurality of the sample sites;

directing the light having the second wavelength onto the sample sites;

measuring light transmitted from the sample induced by the light having the second wavelength; and

correlating the light transmitted from the sample after addition of the reagents with a characteristic of the sample.

37. The method of claim 34, where the step of measuring light transmitted from the sample comprises measuring the light from a plurality of sample sites substantially simultaneously.

38. The method of claim 37, where the step of measuring light transmitted from the sample comprises measuring the light from more than eight sample sites substantially simultaneously.

39. The method of claim 29 further comprising the step of illuminating the sample at a wavelength selected to photochemically activate one or more sample components.

40. The method of claim 29 further comprising the step of exposing the sample to an electrical potential selected to stimulate one or more sample components.

41. The method of claim 29, where the light transmitted from the sample is used to determine a time-dependent property of the sample.

42. The method of claim 41, where the light transmitted from the sample is used to determine an excited state lifetime for a component of the sample.

43. The method of claim 41, where the light transmitted from the sample is used to determine a reaction time for the sample.

44. A light detection device, comprising:

a light source configured to produce light capable of exciting luminescence;

an optical pattern generator configured to convert that light into light having a preselected intensity pattern;

an optical relay structure configured to project the light having the preselected pattern onto an examination area to form a projected pattern, where the projected pattern substantially conforms to the arrangement of sample sites in at least a portion of a sample holder positioned in the examination area; and

a detector configured to receive luminescence light from a sample positioned in at least one of the sample sites.

45. The device of claim 44, where the light source is a pulsed laser.

46. The device of claim 44, where the optical pattern generator includes a diffractive element.

47. The device of claim 44, where the optical pattern generator includes a lens or mirror array.

48. The device of claim 44, where the optical relay structure includes a fold mirror.

49. The device of claim 44, where the projected pattern is substantially periodic.

50. The device of claim 44, where each portion of the projected pattern includes light from each portion of the light capable of inducing luminescence.

51. The device of claim 44, where the projected pattern comprises an array of spots.

52. The device of claim 51, where the intensity of the projected pattern is substantially uniform within at least a portion of each spot.

53. The device of claim 44, where the number of sample sites is selected from the group consisting of 6, 12, 24, 48, 96, 384, 864, 1536, 3456, and 9600.

54. The device of claim 44, where the sample holder is a microplate, and where the sample sites are some or all of the wells in the microplate.

55. The device of claim 44, where the sample holder is a biochip, and where the sample sites are array positions on the biochip.

56. The device of claim 44, where substantially all of the light in the projected pattern is incident on sample sites.

57. The device of claim 44, where the detector is an imaging detector.

58. The device of claim 44, where the detector is configured to receive luminescence light from all of the sample sites.

59. The device of claim 44, where the light having the preselected pattern follows a first path from the optical pattern generator to the examination site, and the luminescence light follows a second path from the examination site to the detector, where the first and second paths are at least substantially parallel or at least substantially anti-parallel at the examination site.

60. The device of claim 44, where the light having the preselected pattern follows a first path from the optical pattern generator to the examination site, and the luminescence light follows a second path from the examination site to the detector, where the first and second paths are neither at least substantially parallel or at least substantially anti-parallel at the examination site.

61. A light detection device, comprising:

means for producing light capable of exciting luminescence;

means for converting that light into light having a preselected intensity pattern;

means for projecting the light having the preselected pattern onto an examination area to form a projected pattern, where the projected pattern substantially conforms to the arrangement of sample sites in at least a portion of a sample holder positioned in the examination area; and

means for detecting luminescence light from a sample positioned in at least one of the sample sites.

62. A method of detecting luminescence from a luminescent sample, comprising:

outputting light from a light source, the light being capable of inducing luminescence in the sample;

selectively converting the light into light having a preselected intensity pattern;

directing the light having the preselected intensity pattern onto a sample holder so that the light is incident at least substantially only on sample sites in the sample holder; and

measuring luminescence light transmitted from at least one of the sample sites induced by the light having the preselected intensity pattern.

63. The method of claim 62 further comprising the step of correlating the measured luminescence with a cellular property.

64. The method of claim 62, where the luminescence is used to determine a time-dependent property of the sample.

65. The method of claim 64, where the luminescence is used to determine an excited state lifetime for a component of the sample.

66. The method of claim 64, where the luminescence is used to determine a reaction time for the sample.

67. The method of claim 62 further comprising:

exposing the sample to a reagent or an environmental condition;

incubating the sample for a time sufficient for the reagent or environmental condition to detectably effect the sample;

directing the light having the preselected intensity pattern onto the sample holder;

measuring the luminescence light transmitted from at least one of the sample sites induced by the light having the preselected intensity pattern; and

comparing the luminescence light transmitted from at least one of the sample sites with the luminescence light transmitted from the same sample site before the step of exposing the sample to the reagent or the environmental condition.

68. The method of claim 67, where the luminescence light transmitted from each of the sample sites is compared with the luminescence light transmitted from that sample site before the step of exposing the sample to the reagent or the environmental condition.